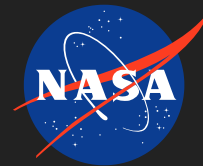


Evaluation of Synthesis & Processing Routes for the High K- Boron Nitride Nano Tubes (BNNTS) for Thermal Management Applications,

Phase I

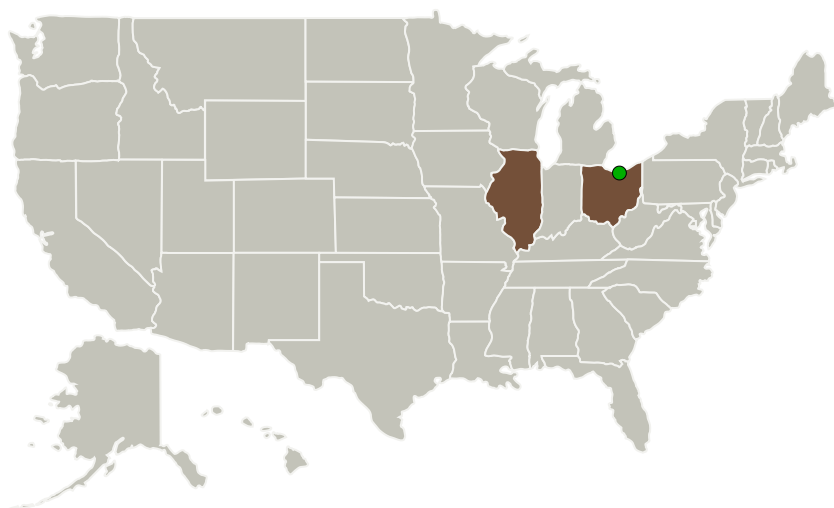
Completed Technology Project (2011 - 2011)



Project Introduction

The purpose of this proposal is to develop and demonstrate the feasibility of processing the High Thermal Conductivity Boron Nitride Nano Tubes (High-K BNNTs) that can provide NASA alternative to develop thermal management hardware for various missions that are planned for the aggressive environment and may need environmental resistance for the hardware. The suggested SBIR proposes to fulfill the technology gap and provide alternative material technology for the thermal management material systems. It proposes to investigate & provide input on feasibility to produce High-K BNNTs and Graphene like h-BN materials and their enriched Boron versions. Our ultimate aim is to provide High-K BNNTs or its Graphene analog in abundance at affordable costs in reproducible manner. It has proposed innovative catalytic Pyrolysis of the unique combination of Boron Precursors that are amenable to ease of scale up. Such approach leverages lesson learned to design high yield processing to assure the quality of the BNNTs that provide high thermal conductivity and demonstrates that clever use of catalyst washing and Nano mesh removing steps can provide desired yields without compromising quality. The processing scheme provides enough freedom to study and collect data to demonstrate possible catalyst engineering and process optimization pathways for optimal processing of High-K BNNTs of desired features that are important for the structural and high temperature applications.

Primary U.S. Work Locations and Key Partners



Evaluation of Synthesis & Processing Routes for the High K- Boron Nitride Nano Tubes (BNNTS) for Thermal Management Applications, Phase I

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Organizations Performing Work	Role	Type	Location
Applied Material Systems Engineering, Inc. (AMSENG)	Lead Organization	Industry Small Disadvantaged Business (SDB)	Schaumburg, Illinois
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Illinois	Ohio
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Project Transitions

**February 2011:** Project Start**September 2011:** Closed out

Closeout Summary: Evaluation of Synthesis & Processing Routes for the High K Boron Nitride Nano Tubes (BNNTS) for Thermal Management Applications, Phase I Project Image Evaluation of Synthesis & Processing Routes for the High K Boron Nitride Nano Tubes (BNNTS) for Thermal Management Applications, Phase I

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/138140>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Applied Material Systems Engineering, Inc. (AMSENG)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

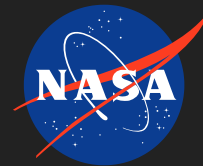
Carlos Torrez

Principal Investigator:

Mukund S Deshpande

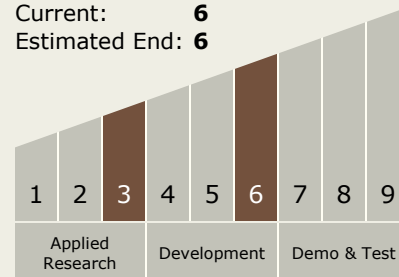
Evaluation of Synthesis & Processing Routes for the High K- Boron Nitride Nano Tubes (BNNTS) for Thermal Management Applications, Phase I

Completed Technology Project (2011 - 2011)



Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System